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**Schlumberger**

International Preliminary  
Examination Authority  
European Patent Office  
Directorate General 2  
Erhardtstrasse 27  
D-80298 Munich  
Germany

Clamart, 21 April 2004

Re. International Application No. **PCT/EP2003/050261**  
(Our ref: **21.1108 WO**)

Dear Sirs:

I refer to the written opinion of the International Preliminary Examination Authority dated March 29, 2004.

It is requested that a detailed substantive international preliminary examination be performed on this application and a second written opinion issued, based on the revised set of claims where claims 1 and 2 have been amended for clarity purpose, as shown in the attached set of claims.

The invention as claimed in claim 1 relates to an impeller with the hub and the blades made of plastic material and molded by trapping a spindle and a magnet in the hub. This provides a light-weight impeller, easy to manufacture without machining and quite suitable for use in a corrosive environment such as hydrocarbon wells.

GB 2,083,210 discloses a flowmeter including a bladed rotor element mounted in a tubular body (20). The rotor includes a hub (1) and helical blades (2) made of plastic material. The speed of rotation is measured through optical means and thus, the device of GB'210 does not include a magnet. Moreover the hub includes a bore (3) – and the molding is carrying out using a core pin to avoid closure of the bore by the plastic material so that the spindle is not trapped in the hub.

US 4,114,440 also disclose a flowmeter including a bladed turbine having a magnet member. This is indeed representative of the prior art as discussed page 3 of our

application. From figures 4 and 5 – and the corresponding part of the specification column 4, lines 45 to column 5, lines 55, it is clear that the manufacturing of the impeller of US'140 requires machining, welding and certainly fails to disclose a spindle and a magnet trapped in the moulding.

From the above, it results that neither GB'210 nor US'440 nor the combination of the two documents provide a teaching of all the features of the invention as claimed and consequently, the invention meets the criteria of novelty and inventiveness.

Yours faithfully,



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CLAIMS (with highlighted changes)

1. Impeller for data acquisition in a flow, made of a plastic material and comprising blades (1) and a hub (2), characterized in that the impeller it is made of plastic material and that it is insert-moulded by trapping a spindle (3) and at least one magnet (4) in its hub (2).
2. Impeller according to claim 1, characterized in that it also the impeller further includes traps an insert (5) to house housing the magnet (4).
3. Impeller according to claim 2, characterized that the insert (5) and the spindle (3) are fixed to each other.
4. Impeller according to claim 3, characterized in that the insert (5) is crimped around the spindle (3).
5. Impeller according to claim 4, characterized in that the cross section (7) of the spindle (3) is reduced at the crimping (6).
6. Impeller according to any one of claims 1 to 5, characterized in that it comprises at least one pair of magnets (4) on each side of the spindle (3) that attract each other.
7. Impeller according to any one of claims 1 to 6, characterized in that the plastic material is a polyetherketone type thermoplastic resin.
8. Impeller according to any one of claims 1 to 7, characterized in that the magnet (4) is based on samarium cobalt.
9. Impeller according to any one of claims 1 to 8, characterized in that the spindle (3) is based on tungsten carbide.
10. Impeller according to any one of claims 2 to 9, characterized in that the insert (5) is based on aluminium.
11. Data acquisition instrument in a flow, characterized in that it comprises at least one impeller (11) according to any one of claims 1 to 10.

CLAIMS (replacement sheet)

1. Impeller for data acquisition in a flow, made of a plastic material and comprising blades (1) and a hub (2), characterized in that the impeller is moulded by trapping a spindle (3) and at least one magnet (4) in its hub (2).
2. Impeller according to claim 1, characterized in that the impeller further includes an insert (5) housing the magnet (4).
3. Impeller according to claim 2, characterized that the insert (5) and the spindle (3) are fixed to each other.
4. Impeller according to claim 3, characterized in that the insert (5) is crimped around the spindle (3).
5. Impeller according to claim 4, characterized in that the cross section (7) of the spindle (3) is reduced at the crimping (6).
6. Impeller according to any one of claims 1 to 5, characterized in that it comprises at least one pair of magnets (4) on each side of the spindle (3) that attract each other.
7. Impeller according to any one of claims 1 to 6, characterized in that the plastic material is a polyetherketone type thermoplastic resin.
8. Impeller according to any one of claims 1 to 7, characterized in that the magnet (4) is based on samarium cobalt.
9. Impeller according to any one of claims 1 to 8, characterized in that the spindle (3) is based on tungsten carbide.
10. Impeller according to any one of claims 2 to 9, characterized in that the insert (5) is based on aluminium.
11. Data acquisition instrument in a flow, characterized in that it comprises at least one impeller (11) according to any one of claims 1 to 10.